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capture of all the positions which at present serve as so many slave trade centers is considered now certain. The root of all the nefarious traffic will thus be destroyed, and the destruction of these merchants means the end of the trade.

Owing to the many natural impediments, Col. Gordon is convinced that the commercial highway of Europe to the rich equatorial districts of Africa does not lie along the Nile but by way of the Indian ocean.

MICROSCOPY.¹

PURITY OF LAKE WATER.—In a Report on Microscopical Examinations of the water from Lake Michigan, as delivered from the city hydrants in Chicago, by Mr. B. W. Thomas, in the Third Annual Report of the Board of Public Works of that city, it is argued that the water for supplying the hydrants is taken from too near the shore, although pumped from cribs which are two miles out in the lake. After describing the method of obtaining organisms by filtering the water through a piece of cotton cloth tied in the form of a bag over the end of a faucet, and enumerating the harmless vegetable and animal forms that constitute nearly all of the filtrate obtained, the paper concludes as follows:

"But occasionally we find what is not quite so acceptable, for instance a *Tardigrada* (*Macrobiotus lufelandi*), a *Paramecium*, an *Anguillula fluviatilis*, a *Hydrachna*, a family of lively *Vorticellæ*, etc., that have evidently been carried out to the lake crib by the lake or river currents from the breakwater or shore, where, at certain seasons, they are found in great numbers, especially near the river or sewer outlets. Storms scatter these organisms in the waters of the lake for some considerable distance from the shore, and when once taken into the tunnels and mains they continue to multiply, and a few of them can be found in the water supply at almost all seasons of the year.

"Careful observation by different microscopists does not leave a reasonable doubt that nearly all of the impurities, properly so called, found in the water as drawn from the hydrants comes directly or indirectly from the sewage and river water that is discharged into the lake. So long ago as December, 1871, Prof. H. H. Babcock, in an article in *The Lens*, "on the effect of the reversal of the current of the Chicago river on the hydrant water," said that the microscopic examinations by himself and others interested in the same study "are sufficient to determine the fact that the reversal of the course of the Chicago river has decidedly increased the purity of the hydrant water by removing a large part of the organisms it had previously contained, and I have no doubt that the sanitary condition of the city—so marked at the time—was promoted by this change in the character of the water supply.

¹ This department is edited by Dr. R. H. WARD, Troy, N. Y.

"Evidence in corroboration of statements like this is so abundant and easily obtained that it cannot be successfully refuted, and the only conclusion that I can arrive at is, that the purity of the hydrant water can only be maintained by preventing the discharge of all impurities into the lake, or by extending the tunnels a sufficient distance from the shore to be beyond their influence."

MICROMETRIC RULING.—Several observers now claim to have resolved the bands of lines 120,000 to the inch, by both Rogers and Fasoldt. Prof. Rogers' recent work has been devoted to the methods and instruments for obtaining aliquot parts of the standard yard and metre with great precision, rather than to the production of extremely close rulings. Mr. Fasoldt is now ruling twelve-band plates, with bands claiming from 12,500 to 150,000 lines to the inch.

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SCIENTIFIC NEWS.

— Congress, at the recent session, transferred the cotton worm investigation from the Department of Agriculture to the Department of the Interior, adding it to the work of the U. S. Entomological Commission, Prof. C. V. Riley, the chairman of the Commission, having resigned his position as Entomologist to the Agricultural Department, owing to the inability of the present Commissioner to appreciate scientific energy and methods, and to give due credit for them, in a department where they are needed just at present more than in any other. Prof. Riley, who has the investigation of the cotton worm in special charge, is now in Texas, with the agent of the Commission, Mr. Schwartz, and has already determined that the cotton worm hibernates in the moth state in the Cotton States; that the worms in Texas appear as early as the middle of May of nearly full size, nearly six weeks before they had ever been seen by the planter; experiments will also be made as to the best means of destroying the worm, on a large scale. Prof. A. S. Packard, Jr., is spending the summer in Colorado, Wyoming, Utah and Eastern Idaho, investigating the present status in the permanent breeding places of the Rocky Mountain locust, and Prof. Cyrus Thomas is to make a trip to Dakota for the same purpose. A number of agents are also at work in the West. The Commission also designs, incidentally to this investigation, working up the Chinch bug, Hessian fly and Canker worms, and has sent out circulars asking for local information as to the habits and statistics of losses. Entomologists are desired to coöperate in the work this season.

— Mr. King, director of the U. S. National Geological Survey, has secured the passage of a bill through Congress authorizing the extension of the operations of the survey over the several States of the Union. It is said that he proposes doing some